made with his aspiration apparatus and by other methods, of the number of positive and negative ions present in atmospheric air under different conditions. The variations in the richness in ions of the air at different heights (studied by means of balloon observations) and the excess of positive ions in the air carried down by the Föhn are of special interest. The electrical phenomena accompanying precipitation are explained by the difference in the efficiency as condensation nuclei of the positive and negative ions. An attempt is made to treat this part of the subject quantitatively. The maintenance of the ordinary fine weather electric field is put down to the difference between the positive and negative ionic velocities.

Prof. J. A. McClelland has described in the Royal Dublin Society's *Transactions* (November) experiments upon ionisation in atmospheric air. These experiments are introductory to a study of the number of ions in the free air of the atmosphere under varying meteorological conditions. Like Prof. Ebert, he has obtained evidence from the results of preliminary experiments of a larger number of ions per c.c. of free atmospheric air than was shown by Prof. Rutherford's measurements in Canada. The latter found on some occasions no more ions per c.c. of the free air than are generally produced *per second* in each c.c. in air in closed vessels, whereas Prof. Ebert's results are more nearly what we should expect if the rate of production of ions in the free air were the same as in a closed vessel.

MEDICAL REPORT OF THE LOCAL GOVERNMENT BOARD.[1]

THE annual report issued by the Medical Department of the Local Government Board always contains matter of interest. The first half of the volume comprises an excellent summary of the contents by Dr. Power, the able head of the department, the vaccination and other statistics, and the reports of inquiries into the sanitary administration of various districts, of outbreaks of epidemic disease, and on the distribution of plague and cholera. There is a mass of information in these pages of the greatest value to the specialist.

But to the readers of NATURE the reports of the auxiliary scientific investigations carried out for the Board will prove of most interest. Dr. Klein is responsible for four of these:—(1) On the nature of the Haffkine plague prophylactic; (2) on the phenomenon of agglutination; (3) on the micro-pathology of hæmorrhagic small-pox; and (4) on the differentiation of the *Bacillus enteritidis sporogenes, B. butyricus,* and *B. cadaveris sporogenes* from one another. The cultural and other differences between these microbes are detailed, and may prove very useful in the bacteriological examination of potable waters. The *Bacillus aërogenes capsulatus* is here alluded to, but that is all. This organism is closely allied to, if not identical with, the *B. enteritidis sporogenes,* and it is hardly right that the work of the Americans in this connection should be dismissed in so summary a fashion.

Dr. Sidney Martin has once more taken up the investigation of the chemical pathology of infective diseases, dealing in this paper with the products of the *B. dysenteriae.* Experiments were performed in order to ascertain whether any toxic substance is produced when the bacillus is grown in fluid media. Indications of the presence of such a soluble toxin, proteid in nature, were obtained, but are not convincing, as no control experiments are mentioned; the most potent poison is certainly contained in the bacterial cells themselves.

Dr. Gordon contributes a useful paper on certain diphtheria-like organisms, and Dr. Houston reports on the inoculation of soil with sewage and on the examination of Chichester well water. Dr. Haldane gives further details of his method for destroying rats on shipboard with carbon monoxide, but this does not seem to be so convenient and safe as the Clayton process with sulphur dioxide.

The reports from the Board's vaccine department are of considerable interest. Nearly 1,000,000 charges of glycerinated calf lymph were supplied from the Board's laboratories during the year under review, and proved to be of excellent quality. Dr. Blaxall gives an account of an outbreak of equine variola, Mr. Fremlin describes a useful method for anaërobic cultivation, and Dr. Green discusses the action of various alcohols and other substances upon vaccine lymph. The volume is illustrated with several excellent photomicrographs.

R. T. HEWLETT.

[1] "Thirty-first Annual Report of the Local Government Board, 1901-2. Supplement containing the Report of the Medical Officer for 1901-2. Price 6*s.* 9*d.*

HERBERT SPENCER.

BY the death of Herbert Spencer England has lost the most widely celebrated and influential of her sons. He has passed away in the fulness of years and honours, having lived to complete the great work that he designed and took in hand half a century ago. Spencer was not without honour in his own country, yet our national indifference to philosophy and to all systematic thinking, and the subserviency of a great part of our professed philosophers to the great German metaphysicians, have undoubtedly prevented his receiving from his countrymen during his lifetime the full measure of recognition that is due to his splendid services to science and philosophy. And, indeed, the enthusiastic and unstinted eulogy of our great dead, voiced by the Press of every civilised country during the past week, has brought home to many of us for the first time the greatness of the man who by sheer force of intellect and character has won the tribute of the world. For in Spencer's work there was nothing designed to attract the attention of the crowd, there was no attempt to write down to the level of the multitude; it was one long and steady effort of a great intellect systematically grappling with the great problems. Yet his books have been translated into a score of languages, have been studied by hundreds of thousands of serious men, and in no small number of them have aroused admiring and enthusiastic gratitude.

Spencer's system of philosophy was broadly distinguished from other latter-day systems, save in a measure from that of Comte, by two features; firstly, his conception of philosophy as the unification of the sciences; secondly, the evolutionary standpoint from which he sought to effect that unification. While the great metaphysicians have for the most part set out with the premise that the world must be intelligible to our minds, and have held it to be their business to present it as an intelligible whole, Spencer prefaced his system of philosophy with a demonstration of the irresolvable mystery that lies behind us and before, and sought merely to discover the most general laws or statements that will express the relations of all the phenomena that science has revealed. That towards this great work he has made splendid and enduring contributions no one will deny. That there remain great gaps in his system is equally undeniable, and the most serious charge that can be made against him is that he professed, or seemed to profess, to have bridged the chasm between the inorganic and the organic worlds, between the world of mechanism and the world of volition.

When Spencer is compared with other great thinkers, he stands distinguished by the immense range of his knowledge of the facts and principles of the sciences and by that wonderful power of generalising their laws which was the instrument by means of which he sought to unify them in one grand scheme of thought. It is true that the specialist may discover shortcomings in his treatment of each one of those sciences, not less in the psychology, in which he is acknowledged as a master both of principles and of details, than in his biology and sociology; and it is true that certain of his great generalisations, for example, the ancestral-ghost-theory of the origin of religions, cannot now be regarded as well founded. Nevertheless, he has contributed to each of these sciences a wealth of illuminating and suggestive ideas, and even those of his hypotheses that have proved untenable have done so great service in provoking thought and discussion that, had he given to the world these unsuccessful suggestions only, he would still have had a great claim upon our gratitude.

On contemplating the completed System of Synthetic Philosophy there is a certain pathos in the fact that the final volumes, to which Spencer had long looked forward as the consummation and crown of his life's labour, namely, those setting forth the principles of ethics, are perhaps generally felt to be the least convincing part of the whole, a feeling which, it can hardly be doubted, was shared by the great thinker himself. But, whatever may be the final verdict as to the value of Spencer's ethical philosophy, there can be no difference of opinion as to the great moral value of his own life. He gave us an example, all too rare and too sorely needed in these days, of a life strenuously devoted through all the years of maturity and age to the realisation of a great object, the spectacle of a man working on with steadfast purpose, unmoved alike by the neglect and by the acclamation of the world, "Voyaging through strange seas of thought, alone" towards the lofty heights of Thought whose dim and cloud-capped towers had caught and fixed his eager youthful gaze.

Spencer's writings may seem to some readers cold and lacking in emotional fervour, and the man himself a little wanting in human sympathies; but can it be doubted that so grand an effort was sustained throughout the arduous years by a deep feeling for the mystery and pathos of the life of man, that tiny organism endowed with the capacity for thought and set to wonder, to labour, and to hope among the spheres that roll for ever through infinite space?

If it could be ascertained what parts of all Spencer's work do, and will, appeal most deeply to great numbers of thinking men, they would probably be found to be, firstly, the demonstration of the Unknowable Mystery that must for ever elude our grasp as the bounds of knowledge are thrown ever wider and wider, and secondly, the doctrine of Transfigured Realism that gives to the mind, painfully halting between the vain imaginings of the pure idealists and the shallow teachings of the materialists, a firm and sane standing-ground from which to view the two great orders of being, the internal and the external worlds.

Much of Spencer's way of thinking and many of his ideas have become a part of the very atmosphere we breathe and cannot but accept, and much of his work must form a part of every future system of philosophy that shall attempt the unification of the sciences. His fame is secure, for posterity can never forget that in an age in which men's minds were oppressed, and in danger of being overwhelmed, by the rapidly growing wealth and complexity of their knowledge of the phenomenal world, Spencer generalised boldly and effectively, breathing life into the dead bones of science.

NOTES.

THREE Nobel prizes for science have been awarded as follows:—for physics, Prof. Henri Becquerel divided with M. and Mme. Curie; for chemistry, Prof. Arrhenius; and for medicine, Prof. Finsen. The formal distribution of the prizes took place on Thursday, December 10, in the presence of the King of Sweden and several members of the Royal family and a distinguished gathering. It is announced that Prof. Finsen has decided to give 50,000 kroner (2753*l.*) from the amount awarded to him to the Phototherapeutic Institute at Copenhagen, and that two members of the governing body will each present it with a like sum.

MR. BRUCE, the leader of the Scottish Antarctic Expedition, which was sent out last year on board the *Scotia*, has arrived at Montevideo from the Falkland Islands. He reports that all is well on the *Scotia*, which is on the way to Buenos Ayres. Six men have been left behind in charge of a meteorological station. The meteorological station referred to is evidently the station set up by Mr. Bruce at Cape Pembroke, Falkland Islands, before the *Scotia* left for the southern seas in January last.

IT is announced that Dr. Oscar Guttmann has presented to the Chemical Society a photograph of the portrait of Roger Bacon in possession of Lord Sackville at Knole House, Sevenoaks.

DR. HANS GADOW, F.R.S., has, we learn from *Science*, accepted an invitation of the Lowell Institute, Boston, to give a course of six lectures, beginning March 29, 1904, on "Coloration of Amphibians and Reptiles." Dr. Gadow will probably give other popular lectures on zoological subjects while he is in America.

IT is reported in *La Nature* that Baron Edmond de Rothschild has sent 20,000 francs to M. Albert Gaudry, president of the Paris Academy of Sciences, to make it possible for the Museum of Palæontology to secure the very precious specimens of the Filhol collection which were obtained from the Quercy phosphate beds.

ON November 28 about three hundred teachers met at New York to form an Association of Teachers of Mathematics in the Middle States and Maryland, the prime object of which is the improvement of mathematical teaching. Prof. David Smith, of the Teachers' College, was elected president of the Association; Prof. H. B. Fine, of Princeton University, vice-president; and Dr. Arthur Schultze, of the New York High School of Commerce, secretary. After President Butler, of Columbia University, had delivered the address of welcome, papers on various aspects of mathematical teaching were read by Mr. Harry English, of Washington, D.C., Mr. Isaac N. Failor, of Richmond Hill, Dr. Arthur Schultze, and Mr. J. L. Patterson, of Philadelphia. The next meeting of the Association will be held at Columbia University, New York City, about next Easter, and applications for membership and other communications may be addressed to Dr. Schultze, No. 4 West 91st Street, New York City.

HIS MAJESTY THE KING has presented a fine stag to the University College of North Wales for its zoological museum. The animal has been specially selected for the college collection, and will illustrate fully the characters of the red deer. Prof. White has had the stag sent to Mr. Edward Gerrard, of Camden Town, to be mounted. The following gifts have reached the college during the past few weeks:—Mr. Assheton-Smith, specimens of the guanaco, St. Kilda sheep, Australian swan, goshawk, grouse, and rhea; Mr. Herbert C. Hodson and Mr. James M. Reid,